COMPUTER APPLICATIONS TECHNOLOGY

NSC WINTER CAMP

2023

LEARNER MATERIAL

Remember to save paper: Print 2 pages on 1 side & Print on both sides of your paper.

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This document is compiled from:

- **NSC/SC Past Question papers**
- **Grade 12 2021 Examination Guidelines**
- **Gauteng Study guide**

This document does not cover All the content in CAT therefore learners must use other study materials available to prepare for the coming examinations.

GOODLUCK WITH YOUR EXAMINATIONS!

Summary of Systems Technology

Hardware

Hardware devices are the tangible parts of the computer, i.e. the parts we can see and touch.
Various devices are considered as hardware and can be divided into:
Input, processing, output, storage and communication devices.

Information Processing Cycle

Input
- Instructions given to the device

Devices:
- mouse/touch
- keyboard
- microphone
- camera
- scanner

Processing
- analysing and processing the instruction/s

Devices:
- CPU
- RAM
- ROM
- graphics card

Output
- Provides the results of the processing

Devices:
- monitor
- printer
- speaker
- projector
- earphones

Storage
- Storing the information for later use

Devices:
- hard drive
- flash drive
- CD/DVD
- memory card
- USB hub

Communication
- To share the results to others.

Devices:
- modem
- router
- switch
- NIC
- cables

More about Input

- Various devices for input can be used to insert data more productively.
- If one of the input modes fail, another can be used.
- More input modes provides better security.

Keylogging:

Records every keystroke on a keyboard. Hackers could install keyloggers in attempt to steal usernames, password or pin numbers.

Convergence:
When different technologies are merged into one device.

Reasons why we use computers/computing devices

Why do we use computers?

To save and be productive

- **Saving paper**: send data electronically
- **Saving time**: faster to create and send information
- **Saving labour**: can perform jobs that humans cannot - complex calculations(24/7)
- **Saving costs**: VoIP/email/IM are cheaper than conventional methods such as phone calls.

To be efficient, accurate & reliability

- **GIGO**: Garbage In Garbage Out – refers to inaccurate input provides an inaccurate result.
- **Data validation**: computers allow users to enter data more efficiently and accurately.

To have effective time and distance

- **Distance**: regardless of where you are you can communicate with anyone in the world
- **Time**: You can instantly communicate with anyone without having to wait

To be able to communicate globally

- **Social Networking**: Can link to anyone around the world (Facebook, Twitter, Instagram)
- **Web tools**: functions and features that helps users:
  - ***Blogs/Vlogs***: Online type of dairy.
  - ***Wiki's***: allows user to create, edit or remove content from a webpage
  - ***RSS feeds***: updates from various sources (blogs, websites) to one central place (email)
  - ***Web 2.0***: allows users to collaborate and share information

Types of computer users





Personal	SOHO	Mobile	Power	Enterprise
•Can perform a wide range of tasks •Cheap to buy •Uses basic input and output devices	•Single Office/ Home Office •Using computers & printers in a network	•Designed for portable users •Tablets, phablets, smartphones, laptops	•Higher specs needed for applications •Expensive to buy •More RAM, CPU and storage needed	•Companies that have many users over the country •Uses a large network to connect

Specifications

Processing: - Entry level CPU & RAM *Input:* - Mouse/Keyboard *Output:* - Monitor/Printer *Storage:* - HDD/CD/DVD *Communication:* - Modem	*Processing:* - Higher CPU & RAM *Input:* - Mouse/Keyboard /Scanner *Output:* - Monitor/Multi-Functional Printer *Storage:* - HDD/CD/DVD /Flash *Communication:* - Modem/Router	*Processing:* - Mobile CPU & RAM *Input:* - Integrated Touchscreen *Output:* - Integrated speaker *Storage:* - HDD/SD-Card *Communication:* - 3G/4G/LTE	*Processing:* - High-end CPU & larger RAM *Input:* - Mouse/Keyboard /Scanner *Output:* - High quality Monitor, Printer/Speakers *Storage:* - HDD/Flash /External HDD *Communication:* - Modem/Router	*Processing:* - Higher CPU & RAM speed *Input:* - Keyboard /barcode scanner *Output:* - Monitor/Printer *Storage:* - Network HDD *Communication:* - Router

Specifications of hardware devices (making buying decisions)

When making buying decisions it is important to consider the type of computer according to the need and purpose of the device/s, i.e. the type of computer user.

Device	Specs	Description
MOTHERBOARD CIRCUIT/PROCESSING		
Personal computer/SOHO user Dual Core i3 1.7 GHz CPU 4 GB DDR3, 1 333 MHz RAM 500 GB hard drive 2 GB integrated HD graphics card Multi-DVD writer USB 3.0 802.11 a/b/g 2 MP webcam 19'' LCD monitor Windows 7 Wireless Keyboard/Mouse 	CPU	- Measured in GHz (1.7 GHz) or (3.2 Ghz) - Refers to the SPEED of processing - Core, Dual core(X2), Quad Core(X4)
	RAM	- Measured in GB (4 GB) or (6 GB) - Temporary memory – volatile (power ON)
	Graphics Card	- Measured in GB - Display adapter for higher quality images - GPU provides processing for images
	Optical Drive	- Measured in MB/GB (Small capacity) - DVD, CD, Blu-Ray
	USB/Firewire port	- 3.0 refers to the speed of reading the device - Firewire faster than USB
	Multi-card reader	- Able to read a variety of memory cards - SDCard, Micro SDCard, Card Adapter
	Connection	- 802.11 refers to specifications and protocols for a wireless network - a/b/g/(n) refers to the versions of speed
Power user: Gamer Core i5 3.2 GHz 6 GB RAM 1 TB HDD 23" 1920X1080 HD display screen 1 GB dedicated graphics 802.11 b/g/n, Ethernet DVD Multi-drive (Optional) Firewire 5Xusb 3.0 Multi-card reader HDMI port Windows 8 	Webcam	- Measured in MP (Mega Pixels) **Advantages**: - Cheaper than digital camera - Non-verbal cues can be seen **Disadvantages**: - Low resolution - Poor connection can delay video
	Wireless Keyboard/Mouse	- **Ergonomics**: equipment designed for health and comfort of the user **Advantages**: - No clutter of cables - Creates more space - Can move further from computer **Disadvantages**: - Costly: uses batteries - Connection could be lost
STORAGE		
CAPACITY 8 bits = 1 byte 1024 bytes = 1 kilobyte (kb) 1024 kilobyte = 1 megabyte (MB) 1024 megabytes = 1 gigabyte (GB) 1024 gigabytes = 1 terabyte (TB)	Hard drive	- Capacity various from 500 GB to 2 TB - Permanent memory – non-volatile **SSD (Solid-State Drive)**: - More expensive - Faster than HDD - More durable **HDD (Hard Disk Drive)**: - Cheaper than SDD - Slower than SDD - Easily damaged
	Flash disk	- Capacity various from 4 GB to 128 GB - More durable than CD/DVD
	DVD/CD	- Capacity DVD (4,7 GB) / CD (700 MB) - Easily damaged/scratched
	Memory card	- Capacity various from 4 GB to 64 GB - Used in mobile devices (phone/camera)
	Cloud storage	- Allows users to save on the internet **Advantage**: - Mostly free - Retrieve data from anywhere **Disadvantage**: - Needs internet - Not secure

A **BACKUP** is a **copy** of data, files or software saved on a different storage medium and kept off-site from the original information. If the original data gets lots/damaged it can be restored.

Device	Specs	Description	
MONITORS/SCREENS			
	Types	- LCD (liquid crystal display) - LED (light-emitting diodes) - Touchscreens - LCD & LED screen uses less electricity.	
	Size	- Measured in inches (19") or (23) - Diagonally from one corner to the opposite corner	
	Resolution	- Measured in pixels (1920 X 1080) - Number of pixels vertical X horizontal - Determines the quality of the image	
	High Quality Resolution	**Advantages** - Larger picture size - Clear and sharp - Better crop options	**Disadvantages** - Requires high quality lens - Larger file sizes
	Aspect ratio	- Common ratios are 4:3/16:9 - Relationship between width X height	
	Response time	- Measured in ms (milliseconds) - Time to shift from one colour to another	
	Refresh rate	- Number of times your monitor updates with new images	
	Contrast ratio	- Common ratio is 1000:1 - Ratio of the darkest vs brightest colours	
	Colour depth	- Measured in 32-bit/64-bit - Refers to the number of bits per pixel	
	Connections	**VGA**  - Video only - Poor quality	**HDMI**  - Both audio & video - High quality
PRINTERS			
Inkjet / Laser / Multi-Function 	Types	Inkjet	Laser
	Cost	- Expensive to buy - Ink cartridges are cheaper - Cost per page is expensive	- Cheaper to buy - Toner is more expensive - Cost per page is cheaper
	Resolution	- Measured in DPI (dots per inch)	
		- Good **photo** quality	- Good **monochrome** quality
	Speed	- Slow printing	- Fast printing
	Colour	- Uses ink cartridges - Usually used for colour printing	- Uses toner - Usually monochrome
3D Printer 	Paper options	- Sizes: A4, A3, A2 - Types: glossy, matte, cardboard	
	Printing Capacity	- Refers to the number of sheets that can be inserted in the paper tray (250 sheets)	
	Functions	- Multi-functional printer: scan, fax, copy	
	Connection Options	- Wireless (Bluetooth/Wi-Fi) - Wired (USB/Ethernet)	
	System compatibility	- Refers to the capacity that the printer and the hardware/software should have to function	
	3D Printer	- Creates 3 dimensional solid objects by adding consecutive layers of material on top of each other	

Ensure environmentally friendly use of printer

- Do not throw cartridges/toner away as they are toxic
- Instead refill and re-use them
- Print both sides of the paper
- Print two pages on 1
- Used recycled paper
- Avoid printing – send email instead
- Print in draft mode to reduce ink usage

<table>
<tr><th>Device</th><th>Specs</th><th>Description</th></tr>
<tr><td colspan="3">SCANNERS</td></tr>
<tr><td rowspan="8"> 
</td><td>Scanner</td><td>Flatbed/Sheet Feed:
- Scans hard copies to soft copies (as images)
- Need OCR software to convert scanned images into editable document.
Advantages: - Images can be shared
Disadvantages: - Needs to be high quality</td></tr>
<tr><td>Biometric</td><td>- Uses unique body features to access a device, i.e. acts as a password.
- Features include: fingerprint, face, voice
Advantages: - More secure – not easy to hack
- Cannot be lost or forgotten
Disadvantages: - Cannot access if feature is damaged
- Expensive to set up</td></tr>
<tr><td>Barcode</td><td>- Reads the code of a product
Advantages: - More accurate
- Faster service
- Easy to manage stock
Disadvantages: - Scan from close proximity
- Damaged barcode won't scan</td></tr>
<tr><td>QR Codes</td><td>Quick Response:
- Uses a camera and OCR technology to decode
- Grouping of black and white squares
- 2D barcode (matrix barcode)
- Can be used as a shortcut to a website or a link to make a payment</td></tr>
<tr><td>RFID</td><td>Radio Frequency Identification:
- Transmits digital data through a receiver and transmitter.
Advantages: - High speed
- High accuracy
- Multiple reading
Disadvantages: - Interference
- High cost
- Fail to read</td></tr>
<tr><td>NFC</td><td>Near Field Communication:
- A standard that allows devices to connect wireless by bringing them closer to each other, e.g. sharing files between smartphones.
Advantages: - Power efficient
- Measure of security: data can only be collected in proximity
Disadvantages: - Not all devices have NCF
- Devices need to be very close to collect data</td></tr>
<tr><td>Magnetic readers</td><td>- Reads the information on the magnetic stripe located on the back of a card.</td></tr>
</table>

How to fix ordinary problems

Ordinary problems	Problem	Solution
Application issues	- App icon missing: files do not open - Application not running: * Not enough RAM * Virus infection * Thrashing: swapping between apps	- Open with: search for applicable app * Add more RAM/Close some apps * Scan computer with anti-virus * Close all files and retry
Mouse is not working	- Mouse is slow or not responding - Mouse not moving at all	- Battery could be flat - Could be wrong surface: glass
Scanning problems	- Edges of the document not scanned - Colours looking wrong - OCR app doesn't recognise text - File is too large	- Reposition document - Select correct colour profile - Increase scanning resolution - Decrease dpi/resolution
Resolution issues	- Screen not displaying correctly	- Set the resolution to fit the screen
Printing problems	- Printer not switching on - Paper jam - Printer not available - Printer doesn't print - Network printer problem	- Check power cable - Remove paper jam - Check driver OR USB connection - Check ink/toner - Check network connections
Disk-errors	- Fragmentation of files: when files are scattered on HDD). This slows down the computer	- Defragmentation is when files are rearranged to be in sequential clusters. DOES NOT FREE UP SPACE
Non-responding apps	- When an application has stopped working and is not responding	- Open the Task Manager (Ctrl+Alt+Del), select the app and End Task

How to check for free space on storage device

Open My Computer/ This PC → Right click on the storage device → Go to Properties → The dialog box will display the space of the HDD

Factors influencing a computers performance

RAM	- RAM is faster than secondary storage - More RAM means faster access to data
Processors	- CPU has a great influence on the speed of the computer - Higher CPU speed will increase the computers speed
Number of applications running	- If there are too many apps running, system resources are shared and this will slow down the computer
Caching	- When a small part of RAM is used to access data faster - Data that is used often is stored in the cache - Web caching saves often opened websites to retrieve faster - Disk caching saves pieces of files for faster access
Disk space and speed	- Disk space doesn't influence the speed, but there should be enough space for temporary files
Malware	- Software designed to be malicious and disrupt the normal functioning of the computer **Types:** - Virus: attached to a file - Worm: copies itself without user intervention - Trojan: Presents itself as a harmless app - Rootkit: Hidden in the system files

Software

Software is a set of instructions, data or programs used by computer to perform specific tasks and for a user to interact with a device. Software is typically divided into two main categories: system software and application software.

System Software

System software is a set of programs that control and manage the operations of a computer.

Feature	Description
OPERATING SYSTEM	
Function	- Allows communication between the hardware, system programs and the user - Controls hardware and software - Runs/manages applications (via file extensions) - Provides the user with an interface (GUI): icons, buttons, tabs and drop-down lists
Managing applications	- Control between single user and multi user - Controls multitasking - Provides the Task Manager - Management of files - File types and properties
Examples	- MS Windows - Linux - Mac OS - Apple iOS - Android
DRIVERS	
Function	- Small programs that acts as a translator between the operating system and hardware devices - Providing communication between the hardware device and the computer
Examples	- Soundcard - Display card - Network card - Printer
UTILITIES	
Function	- Designed to analyse, maintain, configure and improve a computer
Examples	
File management	- Managing files and folders by creating, copying and searching - Importing/Exporting and even conversion of files
Updates	- Updates are important as it keeps newest features available - **Scheduled** updates will run automatically (in case a user forgets to make updates)
Disk clean-up	- To clean the hard drive from all the temporary files that are not in use
Defragmentation	- To rearrange fragments of files that are scattered on the hard drive
File compression	- Allows a user to reduce the size of a file – "Zip"
Backups	- A copy of data, files or software saved on a different storage medium and kept off-site on a different location. If the original data gets lots/damaged it can be restored
Coordinate tasks	- Tasks are coordinated in order for problems not to occur. - FIFO (First In First Out), i.e. printing jobs are send to the print spooler and are queued in the order it was sent
Control security	- **Firewall**: hardware or software that stops unauthorized access to the computer. - **Access control**: usernames and passwords - **Anti-malware**: prevents malware like spyware, viruses, worms and Trojans. - **Adware Blocker**: Blocks adds that are part of software.
Anti-virus	- Software designed to stop viruses from entering the system - Scanning removable devices, email attachment and websites for viruses. e.g. Avast!; Bitdefender

File Types
File extensions determine the type of file (e.g. docx; mp3)
File Properties
Indicate the size of a file.
Attributes: Read-only/Hidden
Metadata
Additional information of a file.
(e.g. Author, Title, Location)

Application Software

Application Software is created in dealing with user input to help the user perform a specific task.

Description	Examples
PRACTICAL APPLICATION	
- Applications used to create, edit and design information.	- Word processor, Spreadsheet, Database, Presentation - Photoshop
REFERENCING SOFTWARE	
- Instead of using printed materials such as books, dictionaries, encyclopaedia's	- Google Earth - Wikipedia - Google Translate' - Babylon dictionary
COMMUNICATION SOFTWARE	
- Software used to communicate with anyone anywhere.	- Skype - WhatsApp - Facebook - Email, etc.
DOCUMENT MANAGING SOFTWARE	
- An application used to manage and store documents. - Functions include: Storage, Searching, Indexing	- Windows Explorer - eFileCabinet
WEB BROWSERS	
- An application used to access websites	- Edge - Mozilla Firefox - Google Chrome - Opera Mini

Software that enhances productivity, efficiency and accessibility

Using specific software applications can help to be more efficient and productive. The following are examples of these software:

Voice recognition	Allows a computer to recognise spoken words: - For disabled users - Typing a document with speech **Advantages:** - Natural input method - Relatively cheap, no special hardware needed. **Disadvantages:** - Background noise can be an issue - Voice can be recorded and played back (Biometric input) - A cold may affect a user's voice
Typing tutors/Keyboarding skills	Typing tutors can help improve the speed of typing.
Note-taking software	Allows users to make notes on the device. Software can convert handwritten notes to digital.

Buying software

When buying software, you should consider the following:

- What will the software be used for?

- When will the software be used?
- Who will use the software?

Software Licensing

These are terms and conditions for installing software on a computing device. These conditions include:

- No copying or sharing of the software
- No changes are allowed to be made; (unless it is open source)
- Not allowed to be installed on more than one device; (depending on the EULA)

The following are End User License Agreements (EULA):

Single User License	Multi-User License	Site License
•One device only	•More than one device as stipulated by the agreement	•Any number of computers as long as they belong to one company

Software classifications

<table>
<tr><td>Stand-alone
vs
Integrated</td><td colspan="2">- Stand-alone software that can "stand on its own"
e.g. Windows 10</td><td colspan="2">- Integrated software is when more than one software is bundled into a package
Advantages:
- Interface is the same
- Installation as a unit
- Data can easily be transferred
- Cheaper to buy than separate options
e.g. MS Office Suite</td></tr>
<tr><td>Freeware
vs
Shareware</td><td colspan="2">- Freeware is provided free of charged
- The full program and features are available for use</td><td colspan="2">- Shareware is provided free of charge, with conditions:
• Only for a period of time (trial)
• With limited features
This is used for a user to see if they would like to buy the software after the trial version</td></tr>
<tr><td>Proprietary
vs
Open-source</td><td colspan="2">- Proprietary software is software you buy, however do not own
- You pay for the rights to use the software. (EULA)
- The source code is never released</td><td colspan="2">- Open-source software is free
Advantages:
- Software can be shared
- Source code can be edited
Disadvantages:
- Little or no support to users
- Not as user friendly
- Compatibility issues</td></tr>
<tr><td rowspan="3">Web-based
vs
Installed</td><td colspan="2">- Web-based applications are accessed via the internet and can be accessed from anywhere anytime</td><td colspan="2">- Installed application that can be access without removable devices or the internet</td></tr>
<tr><td>Advantages</td><td>Disadvantages</td><td>Advantages</td><td>Disadvantages</td></tr>
<tr><td>-No need to install
-Doesn't take storage space</td><td>-Web browser need to be compatible</td><td>-More functions to use
-Doesn't need internet access</td><td>-Must be installed
-Takes up storage space</td></tr>
</table>

	-Automatically up-to-date -Accessed from anywhere at any time	-Needs internet access -Security risk -Slower than installed apps		-Only on computer where installed

Software Problems/Issues

Issue/Problem	Description	Solution
Outdated software	Updating software would ensure that all features are up to date. If software is outdated it could cause software bugs/errors.	- Updates can be downloaded from the internet or from a storage medium. - Applications should be updated for new features to be added (new version) **Automatic updates** **Advantages:** - Software is always up to date. - Latest features available **Disadvantages:** - Uses bandwidth without user's knowledge - Takes up space on device
Flawed software	When an application has a bug (a small error = software bug) accidentally created by the programmer. This could cause calculation issues, navigation issues, etc.	- A patch is a small update to fix a software bug. - A service pack includes all patches and updates of the software
Compatibility issues	When the application is not well-suited with the hardware and software of your computer it would not function properly.	- Ensure that you verify the system requirements before purchasing software.
Read-only files	When a user can only read a file and not edit or change information.	- Save the file with a new name/location. - Go to the properties and remove the Read-only attribute.

System Requirements

System requirements refer to specific hardware and software needed for applications to "run" on a computer.

Minimum requirements	Recommended requirements
The lowest specification for the software to operate at all.	Specifications that allow the application to work at an optimal level.

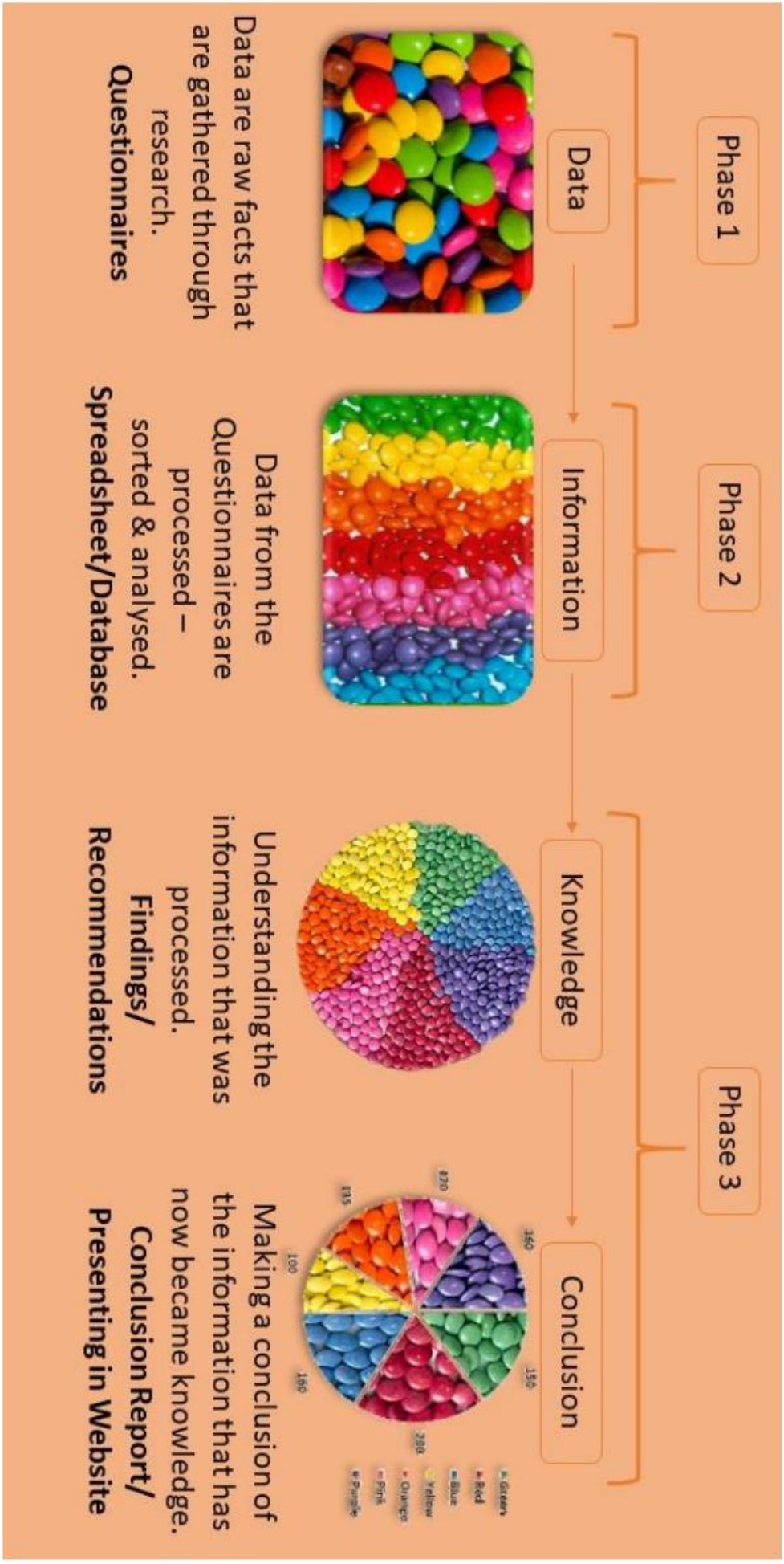
Typical requirements may include:

- Operating system
- CPU speed
- RAM
- Graphics processing
- Storage space

Compatibility:

When two systems work together – hardware and software.

When buying software make sure that the application will be **compatible** with the computer.


Phase 1
Data
Data are raw facts that are gathered through research.
Questionnaires
Phase 2
Information
Data from the Questionnaires are processed – sorted & analysed.
Spreadsheet/Database
Phase 3
Knowledge
Understanding the information that was processed.
Findings/
Recommendations
Conclusion
Making a conclusion of the information that has now became knowledge.
Conclusion Report/
Presenting in Website

ACTIVITY 1

Use the same number as is in the activity. **Duration [10 minutes]**

9.1 Computing devices will be used to display the recipes and to capture the results.

Study the specifications of the following two devices:

DESKTOP COMPUTER	TABLET
	
• 2.4 GHz CPU • 8 GB DDR4 • 256 GB Solid State • 4 GB Video Card • 21" Monitor • 4 x USB ports • Integrated 10/100/1000 Network Port • Integrated HDMI port • FHD Webcam, 1920x1080 • SD Card Slot • On-site warranty	• 1300 MHz CPU • 2 GB RAM • 16 GB internal storage • Touch screen • 25.6 cm (10.1") display • Rear camera 8 MP • 4G standard LTE, Wi-Fi • Bluetooth version BT 4.0 • 2G standard, GSM, 4G • SD Card Slot

9.1.1 What is the speed of the faster processor when comparing the two devices? (1)

9.1.2 Why is the tablet more suitable for outdoor use? (1)

9.1.3 State TWO ways in which to extend the storage space of the tablet. (2)

9.1.4 Explain why the desktop computer is better for graphics processing by referring to its specifications, other than the CPU. (1)

9.1.5 Explain what an on-site warranty is AND why a tablet does not usually have an on-site warranty. (2)

ACTIVITY 2

Use the same number as is in the activity. **Duration [30 minutes]**

4.1	Discuss the concept of *communication* in the information processing cycle.	(1)
4.2	Give ONE reason why a hard disk drive is not preferred in a laptop.	(1)
4.3	You wish to set up a 'small office home office' (SOHO) with four computers.	
4.3.1	Explain TWO criteria that could be used to select a printer for this office.	(2)
4.3.2	What type of software licence would you prefer when installing an office suite for this office? Motivate your answer.	(2)
4.3.3	Give TWO benefits of buying a UPS for this office.	(2)
4.3.4	Which problem could arise if the printer purchased for this office is NOT set as the default printer?	(1)
4.4	Give TWO disadvantages of using open-source software.	(2)
4.5	Explain why a user would prefer using a virtual keyboard rather than a physical keyboard.	(1)
4.6	It is good practice to make backups of data.	
4.6.1	Give TWO reasons why it is important to make offline backups.	(2)
4.6.2	Why should you never make an offline backup of your work on the same device as the original work?	(1)
4.6.3	Name a file extension which is typically associated with backup file sizes that were reduced.	(1)
4.7	What change must be made to the resolution of a monitor to assist a visually impaired user?	(1)
4.8	What is the Task Manager most commonly used for?	(1)
4.9	Give TWO reasons why it is not recommended that an accountant uses a trial version of financial software.	(2)
4.10	Suggest TWO ways to resolve the problem of a mouse that does not work properly, other than replacing the mouse.	(2)
4.11	Name TWO kinds of information found in the metadata of a file.	(2)
4.12	Discuss the purpose of a QR code.	(1)
		[25]

ACTIVITY 3

Use the same number as is in the activity. **Duration [30 minutes]**

4.1 What is the purpose of a product key when installing software? (1)

4.2 Give TWO differences between the user interfaces of laptops and smartphones. (2)

4.3 Briefly explain TWO ways to repair a flash drive when the operating system reports that there are errors on it. (2)

4.4 All hardware in a computer require drivers to work.

4.4.1 What is a *driver* AND what is its main function? (2)

4.4.2 Why do you NOT have to install a driver when connecting plug-and-play devices? (1)

4.5 The SD card on your camera is full.

Which device would you use to upload the photos to your computer without connecting your camera to the computer? (1)

4.6 Health trackers are often worn by athletes and people who are health conscious.

Name TWO types of outputs a user would expect to find on his/her health tracker. (2)

4.7 You formatted a document on your computer that you wish to send to a friend.

4.7.1 Give TWO reasons why the document will sometimes not display in the way you created it on your friend's computer. (2)

4.7.2 How can you ensure that a document you create on your computer will display as you created it on someone else's computer? (1)

4.8 Give TWO reasons why the use of online applications/software has become popular. (2)

4.9 The quality of cameras on smartphones improves every year.

Explain why smartphone cameras have not made dedicated cameras obsolete yet. (2)

4.10 Give TWO reasons for using voice recognition software. (2)

4.11 State TWO possible problems associated with 3D printing. (2)

4.12 Pop-ups can suddenly appear in the browser window when browsing the internet.

4.12.1 Give TWO disadvantages of pop-ups appearing on a web page in a browser window, other than being distracting and irritating for a user. (2)

4.12.2 Why does a pop-up blocker not block all pop-ups automatically? (1)

[25]

Summary of Internet Technologies

Types of digital communication

The way in which one computing device transfers data from one point to another. Protocols control the way devices send and receive data. Examples include emails, messaging, blogs, wikis and social networks.

Video Conferencing

Video Conferencing is used mostly by business to conduct meetings and conferences by means of video communication. Video conferencing uses a network of computing devices to talk, see and hear one another even if they are in different locations

Advantages	Disadvantages
Can save money on traveling costs.	Expensive to setup and maintain a video conferencing lab. One needs a fat internet connection.
Video and audio information can be shared.	A power failure or network failure can cause a break in communication
Enables collaboration and can strengthen relationships between colleagues.	Training is needed to use the equipment.

Good Practices:

- *Only speak about the matters that need to be discussed at the meeting.*
- *The video lab must be quiet and have no noisy distractions*
- *Only run the video program during the video conferencing process.*

More information on video conferencing

Communication Devices

Computers and Laptops

Computers allow us to make a variety of digital communication methods possible, including: instant messaging, VoIP and video conferencing.

Wearables

Small devices that have been designed to worn or attached to your body. Examples include Smartwatches, Smart clothing and Fitness trackers.

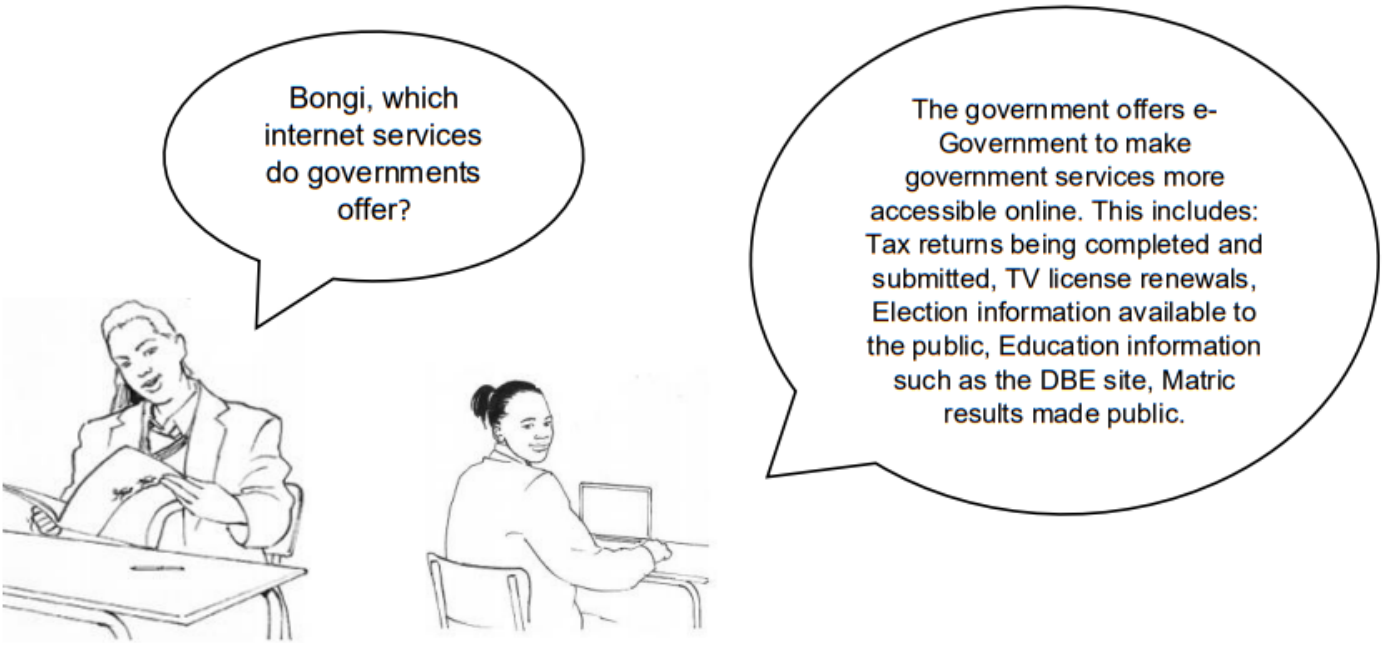
Smartphones

A smartphone is a type of computer that people can carry around. A smartphone is an example of convergence (multiple/various technologies combined into a single device). A smartphone has various functions, including the following: GPS, MP3 player, Video and sound recorders, etc.

Tablets

Tablets are portable hand-held computing devices that are bigger than smartphones, but smaller than laptops. There are two types of tablets: consumer tablets and PC tablets.

Government Internet Services and information such as tax returns, TV license payments and election information



Features of web browsers

Blocking websites

Blocking websites is when an internet proxy or firewall prevents a user from gaining access to certain network resources such as certain websites or FTP Servers. One would block certain websites to avoid phishing websites, to avoid spam disturbing your computer with adware and popups or to add parent filters to content for children.

Examples include most antivirus software which uses software filters to block unsafe websites to ensure a safe browsing experience

Learn How to Block websites

Search engines

Search engines are websites that allows you to type in a keyword or a phrase and then searches through the internet to find what you are looking for.

(Image Source: https://www.airsassociation.org/media/k2/items/cache/77977b7b6d72dcd641d05e47eb2e5f09_XL.jpg)

Browser plug-ins

Add-on software that fives a web browser additional functionality. Plug-ins allow a web browser to display additional content that was not originally designed to display.

Pop-up blocker

Pop-ups advertise products or features on websites. Advertisers design theses advertisements to be eye-catching. Pop-up blockers block these advertisements.

Home Page settings

A webpage that serves as the starting point of a website. It is the default webpage that loads when you open a website.

History and Favourites

History shows a list of webpages that are visited over a period of time by category. The list contains the URLs of the websites that were visited.

Favourites can be set by a user if he/she visit these webpages regularly, so that they can easily be accessed.

Bookmarks

Bookmarks are saved shortcuts that directs a user's browser to a specific webpage, file or document. One can identify a specific website by looking at the title, URL and icon of the bookmark. Can also be called 'Favourites' or 'Starred'.

How to create a bookmark

Caching

Caching is the temporary storage of web documents that you have visited to reduce bandwidth usage, server load and lagging.

Uses of computer communications

RSS Feeds

Really Simple Syndication are text files designed to deliver regular internet content and news updates to subscribers. One can download RSS readers that will give you automatic updates on new content on your browser.

Podcasts/Vodcasts

A **podcast** is a free service that allows internet users to pull audio files from a podcasting website to listen to on their computers or audio players. A **vodcast** allows users to pull video files from a podcasting website.

Chatrooms

A website or an online service that provides an online virtual space for users with a common interest to communicate in real time. Examples include: Badoo, Rawr and ICQ

Social Networking

Social networking sites are interconnected online communities which help people make contacts that would benefit their social and/or professional needs.

(Image Source: https://makeawebsitehub.com/wp-content/uploads/2016/04/social_media.jpg)

Wikis

Wikis are used to obtain and share information with other users. The websites can be edited and access by any user in the world, so long as that person has a computing device and an internet connection. Examples include, Wikipedia, WikiTravel, WikiHow and WikiBooks.

Blogs/Vlogs

A **blog** is a diary-type website that maintains an ongoing record of information and has the function of a journal. A **vlog** is a blog that contains video content.

Advantages	Disadvantages	Good practices
You can share your knowledge	Posting personal information online can be dangerous	Keep your blog exciting to draw peoples' attention
One can learn new things	Certain blogs need to be private or require logins because of sensitive content	Post regularly on your blog – always keep it updated
Increases search engine traffic.	Blogs and vlogs lack many important plugins that can improve the functionality of your site	

Examples include:

WordPress **Blogger** **Weebly** **Wix**

How to write a blog

Digital Communication

Strengths of Digital Communication	Weaknesses of Digital Communication
Very fast over short and long distances	Difficult to prove that a digital communication is from the person it says it's from
Much cheaper than postal services, e.g. schools' SMS systems	Sometimes it is difficult to separate your social life from your work life
Data, videos and audio can be uploaded at the same time	Hackers, crackers and fraudsters misuse digital communication to harm others

Advantages	Disadvantages	Limitations
Contributes towards green computing	Equipment such as smartphones and microwave towers may not look pleasant in the environment	Electromagnetic fields and radio signals can interfere with wireless communication
Files can be saved or shared electronically	Many people do not have computer skills	
Allows for worldwide collaboration	Some people may become addicted to cyber activities, which leads to anti-social behaviour	

Bluetooth

Bluetooth is a wireless technology that uses radio waves to communicate, or transmit data or voice over a short distance.

Advantages:

- Widely used
- Free of charge
- No need for any cables

Disadvantages

- It drains battery power of a device
- Little security.
- Slow data transmission speed.

(Image Source: https://2.bp.blogspot.com/-7Y-LzHDenFE/VQvsPB9itWI/AAAAAAAAANg/mtvQMq9Bkr0/s1600/bluetooth-marketing.jpg)

Wi-Fi Hotspots

An **area** where you can connect wirelessly to a network with internet access. Many companies use Wi-Fi hotspots to attract more customers (such as KFC). Hotspots are usually found at places such as, restaurants, shopping malls, airports and other public places.

A video explaining WiMAX

WiMAX

Worldwide Interoperability for Microwave Access is a wireless communication standard to describe long-range wireless networking for mobile and fixed internet connections.

Global Positioning System (GPS)

A **GPS** uses satellite-based radio navigation in order to determine where you are in the world. The information can be used to navigate to a different destination or to let other people know where you currently are.

Advantages	Disadvantages
Are available from anywhere in the world.	GPS Devices uses a lot of power.
Can be used to locate a person.	Signal might be affected by weather.
Software is always up-to-date.	GPS accuracy depends of the strength of the signal.

(Image Source: https://i3.wp.com/www.digitbin.com/content/uploads/Inaccurate-and-wrong-Google-maps-GPS-for-Android.png)

Internet Attacks

DoS attacks

Denial of Service attacks are attacks where a computer is bombarded with huge amounts of data to slow down a computer network.

Sniffer attacks

A small program that can read packets of data being sent on a computer or a network.
Encryption is a process where data is translated into a secret code for secure transmission.

ACTIVITY 4

Use the same number as is in the activity. **Duration [15 minutes]**

1. State TWO netiquette rules for a group chat on social media. (2)
2. Most learners use mobile devices to browse the Web. 9.1.1
   a. Some learners confuse the terms internet and World Wide Web. Explain the terms internet and World Wide Web. (2)
   b. What term is used to describe the concept where a learner is able to use more than one app on the same device at the same time? (1)
   c. Give ONE reason why a web page does not open in the browser on a mobile device. (1)
   d. State ONE argument against accessing the internet using a public Wi-Fi hotspot. (1)

ACTIVITY 5

Use the same number as is in the activity. **Duration [15 minutes]**

1. Which ONE of the following statements is NOT true about web applications?
   A. One may have to pay for the service.
   B. More than one person can work on a document at the same time.
   C. One does not need an Internet connection to access the resources.
   D. Data can be synced across multiple devices. (1)
2. Indicate whether the following statement is TRUE/FALSE. Rewrite the correct underlined word if the statement is FALSE. (1)
   A DoS attack occurs when a computer or network is flooded with a huge amount of useless data.
3. Give ONE reason why one would install a browser plug-in. (1)
4. How would an RSS feed on a blog benefit its users? (1)

ACTIVITY 6

Use the same number as is in the activity. **Duration [15 minutes]**

5.1	Name a type of internet connection you would recommend for a school AND motivate your answer.	(2)
5.2	What is the advantage of using the https protocol over the http protocol?	(1)
5.3	Suggest TWO ways in which software can be used to protect a network from unauthorised users.	(2)
5.4	Give TWO reasons why some users prefer to listen to a podcast rather than reading text.	(2)
5.5	A particular router has only four network cable ports. State TWO ways to connect more than four devices to this router.	(2)
5.6	Give TWO reasons why internet access is important to users of computing devices.	(2)
5.7	Discuss TWO advantages of using a VPN.	(2)
5.8	You cannot connect to the computer network in your classroom. Suggest TWO possible ways to resolve this problem.	(2)
		[15]

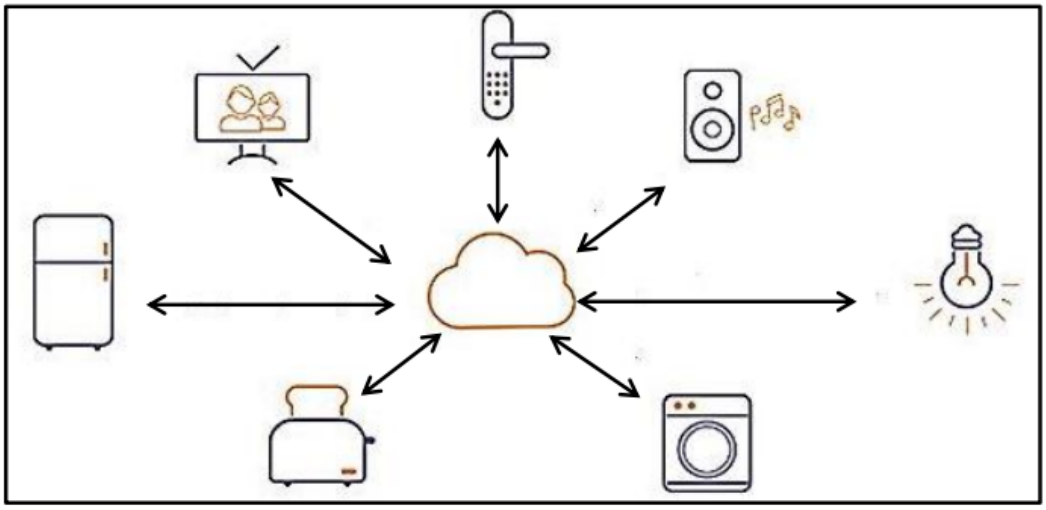
ACTIVITY 7

Use the same number as is in the activity. **Duration [15 minutes]**

5.1 Give TWO advantages of grid computing. (2)

5.2 Give TWO similarities between *VoIP* and *streaming*. (2)

5.3 Study the diagram below and answer the questions that follow.



5.3.1 Name the technology that is represented by the diagram above. (1)

5.3.2 What do the arrows in the diagram represent? (1)

5.3.3 State ONE concern that could arise around the technology in the diagram above. (1)

5.4 Why would you use a browser add-on? (1)

5.5 Give ONE reason why you would adjust the home page settings in a browser. (1)

5.6 From an end-user point of view, explain TWO disadvantages of deleting the browser history and cache. (2)

5.7 Explain the concept of a *cap* in the context of internet access. (2)

5.8 Suggest TWO benefits of synchronising the calendar in a web-based e-mail client. (2)

[15]

Summary of Network Technologies

Wide Area Network (WAN)

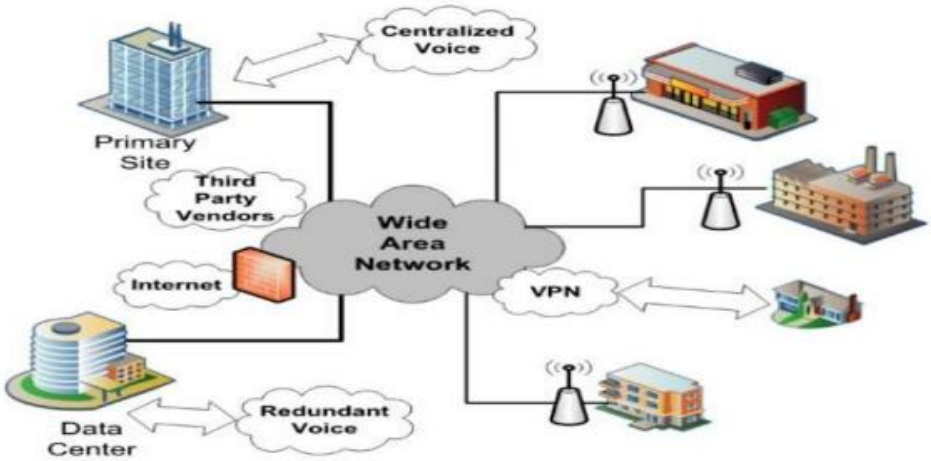
A wide area network is a network that connects computers over a wide area such as a city or province. A WAN uses: cables, radio waves, microwaves and satellites as communication methods.

Purpose of WAN:

- To connect LANs together
- Allows communication to take place over a large distance.
- Centralisation of shared data

Advantages and Disadvantages of WANs

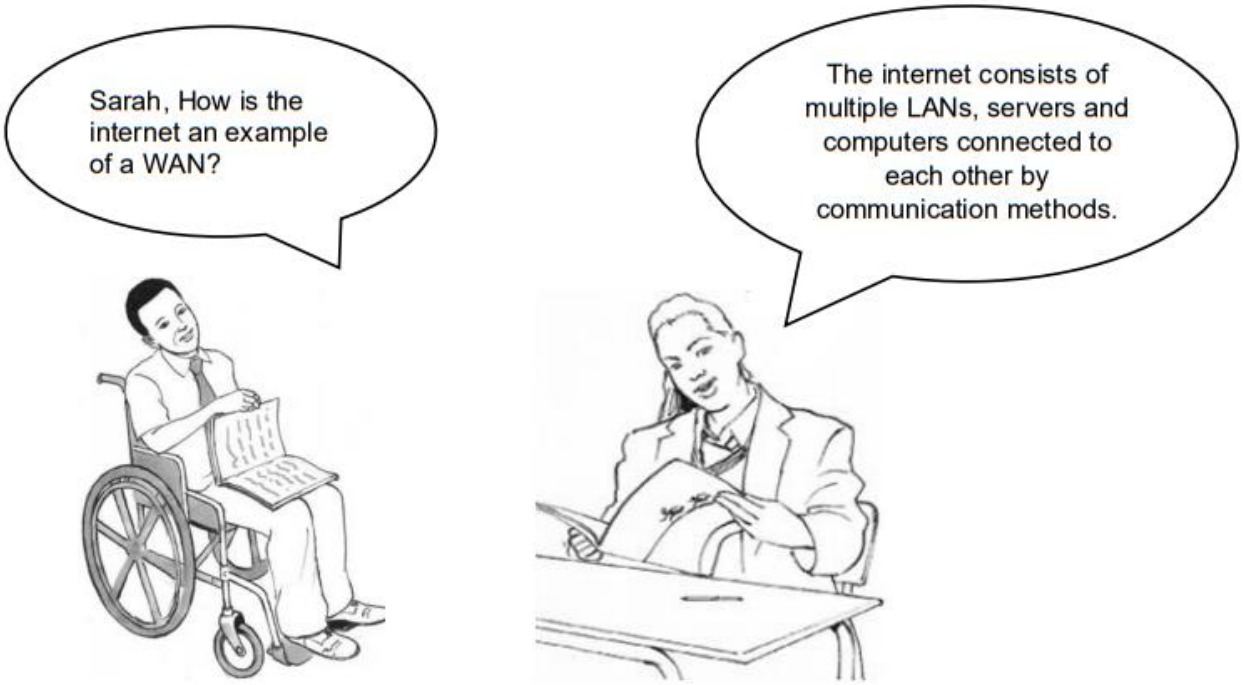
Advantages	Disadvantages
Allows sensitive data to be shared over a wide distance	It is very expensive to setup and maintain the network
Multiple LANs can be connected so that large companies can communicate.	Security issues such as information theft.



For more information on WANs scan me:

SCAN ME

(Image source: https://images.app.goo.gl/QWTzCuawBrH2oh5w5)



Network devices:

Modem: *Hardware device that allows a computer to send and receive data over a telephone line, satellite or cable.*
Switch: *Allows multiple devices on a network to communicate.*
Router: *A device that connects a network to other networks wirelessly or through cables.*

Internet Services

The internet is a wide area network that can be accessed from any computing device (Computers Smartphones, etc.), as long as the computing device is connected to the internet.

Real-Time Messaging - Instant Messaging (IM)

Online chat programs that allow a user to send messages (text and multimedia) in real-time over the internet. Examples include: WhatsApp Messenger, WeChat and Telegram.

Advantages

- Allows users to chat in "real time"
- Messages are delivered to the other party instantly after pressing the send button.
- One can see when messages have been read.
- Communication can take place regardless of distance

Disadvantages

- No time to review messages you are sending
- Messages are not always saved
- The personal experience of talking to people is taken away due to instant messaging

Voice over Internet Protocol (VoiP)

Voice sounds that are converted into data so that computing devices can transmit it over the internet. Examples include, Skype, Google Hangouts, Discord and ZoiPer.

For more information on VoIP scan me:

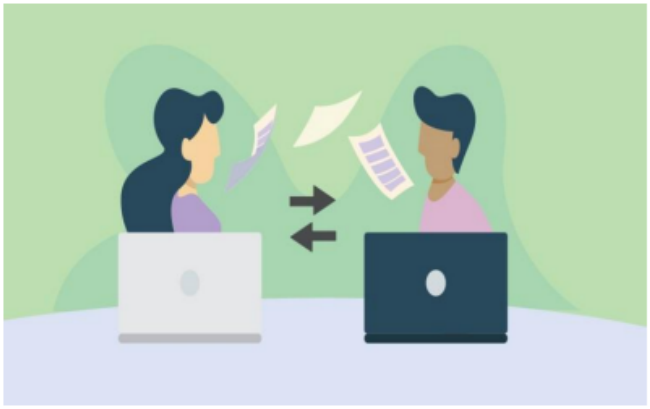
SCAN ME

File Transfer Protocol (FTP)

FTP is a set of rules that networked computers use to communicate to one another. It is a language on a TCP/IP network such as the internet, examples include, FileZilla.

File Sharing

Accessing or sharing of files by one or more users. For example: ShareIt, uTorrent and Xender.



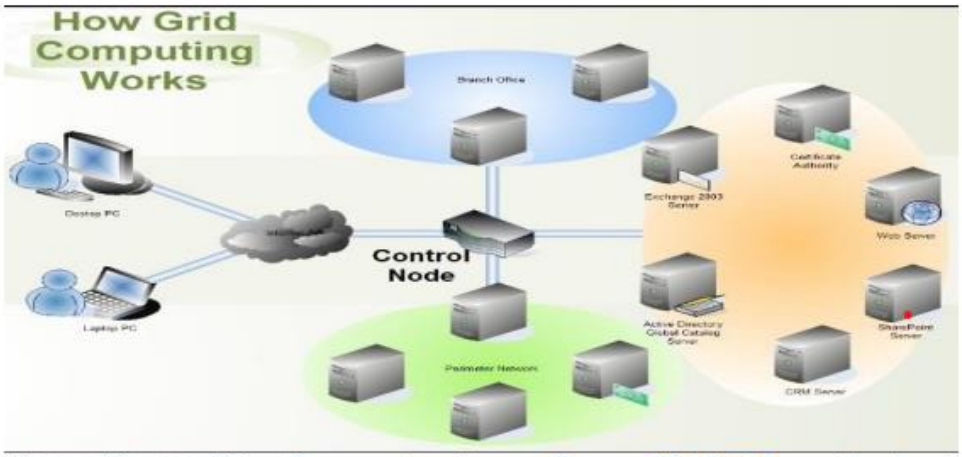
(Image Source: https://www.sodapdf.com/blog/wp-content/uploads/2019/06/file-sharing.jpg)

Grid Computing

Grid Computing refers to using different computers' resources in different locations to achieve a common goal or to solve a specific problem. Examples include Weather forecasting and Earthquake simulations.

Scan me for a video on Grid Computing

SCAN ME



(Image Source: https://ecomputernotes.com/images/Grid%20Computing.jpg)

Scan me for a video on Cloud Computing

SCAN ME

Cloud Computing

Cloud computing refers to storage and application facilities on a remote server that is connected to a network on the internet such as Google Apps and Microsoft Office Online.

Purchasing Internet Connections and Access

Types of connections

Cabled/Wired Connection (ADSL – fibre optics, UTP cables)		Wireless Connection (Bluetooth, 4G and Infrared)	
Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
Cheaper than wireless connections	Fixed in a single location	Can be used in places where cables can't reach	Connectivity can be lost
More reliable than wireless connections – not prone to interferences	Can be difficult to set up	Can connect portable devices such as Smartphones and Tablets	Requires extra cost and equipment to set up
Faster transfer rates	Messy cables are untidy	Instant transfer of information is easier	Not all devices have wireless capabilities

Capped, Bundle

Capped refers to the limit the ISP gives to clients on the amount of data used over a certain time frame. Once a user reaches their limit (cap) a bundle can be purchased. A bundle is a specific amount of data purchased from the ISP, which might expire after a certain period

Data Transmission Speed

Data Transmission Speed refers to the speed at which data can be transferred from one device to another via a communication channel such as wires, fibre-optic cables and wireless networks.)

If the data transmission speed is high:

- Streaming of high definition videos is smooth
- Many users can use the connection at the same time without any 'lagging'
- Cloud storage will sync faster

Comparisons of transfer rates

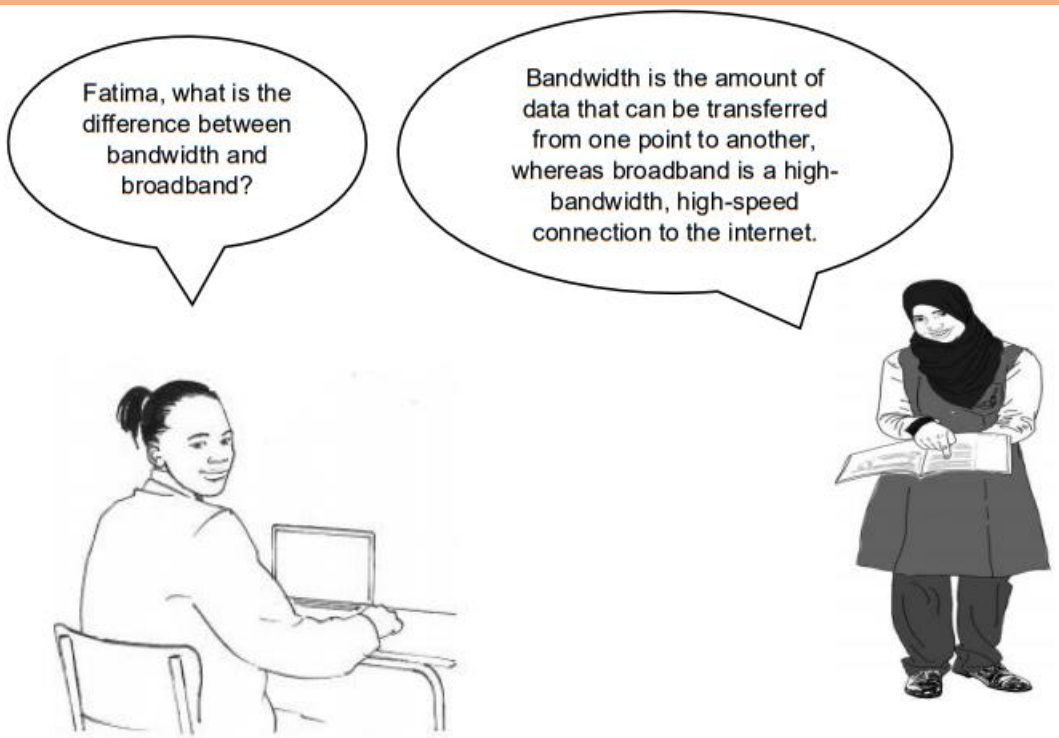
- ADSL: Up to 15 Mbps
- 4G/LTE: Up to 50 Mbps
- Fibre: Up to 105 Mbps

Internet Service Providers (ISP)

An ISP provides businesses and individuals with internet services such as, internet access, for a monthly fee. ISPs have fast, permanent connections to the internet. Examples include: MWeb, TelkomSA, Internet Solutions, Cell C and VOX telekom.

Advantages	Disadvantages	Limitations
If cables are stolen, no additional costs will be added	ISP manages all connections	Certain areas do not have internet coverage due to no infrastructure
Installation/Maintenance is done by the ISP	CAP or line speed changes need to be done in-store	Internet connection depends on area's coverage
ISP offers regular support with any internet issues	Not all areas are covered by the ISP	

Bandwidth vs Broadband



Downloading and Uploading

Downloading refers to the transmission of a file from one computer to another. When downloading a file, one requests it from another computer.

Uploading refers to the process of moving files from your computer and placing them on a server so that other people can see them.

Scan me for information on Downloading / Uploading

SCAN ME

ACTIVITY 8

Use the same number as is in the activity. **Duration [20 minutes]**

1. The internet is an example of a WAN. Why can the Internet be described as a WAN?
2. Provide ONE advantage and ONE disadvantage of WANs.
3. Match the term/concept in Column B with the definition in Column A. Write down the correct term/concept next to the question number.

	Column A	Column B
3.1	A device that connects network to other networks wirelessly or through cables.	Switch
3.2	Hardware device that allows a computer to send and receive data over a telephone line, satellite or cable.	Router
3.3	Allows multiple devices on a network to communicate.	Modem
		Network

4. Name TWO advantages of real-time messaging.
5. Which one of the following is NOT an example of real-time messaging apps?
   A. FlipGrid
   B. Telegram
   C. WeChat
   D. WhatsApp Messenger
6. Indicate whether the following statement is TRUE or FALSE in terms of the disadvantages of real-time messaging:
   No time to review messages you are sending

ACTIVITY 9

Use the same number as is in the activity. **Duration [20 minutes]**

1. Differentiate between grid computing and cloud computing.
2. Name THREE hardware components one would need to hold a video conference.
3. Define the term FTP.
4. Give an example of an FTP site.
5. What is an Internet Service Provider? Give an example of an ISP.
6. Name TWO services an ISP can provide to its customers.

ACTIVITY 10

Use the same number as is in the activity. **Duration [20 minutes]**

1. What is the difference between capped and a bundle?
2. Define the concepts downloading of files and uploading of files.
3. Consider the following advertisement

- ADSL up to 10 Mbps
- 5 free e-mail addresses
- 10 GB free cloud storage
- Free ADSL router

   a. The advertisement indicates that the maximum speed is 'up to 10 Mbps'. Give TWO possible reasons for an ADSL line not performing at its maximum speed.
   b. What is the purpose of the router mentioned above?
4. State TWO factors that should be carefully considered when choosing an ISP (internet service provider), other than cost.
5. Name TWO technologies/protocols that use encryption to secure communication over a wide-area network.

ACTIVITY 11

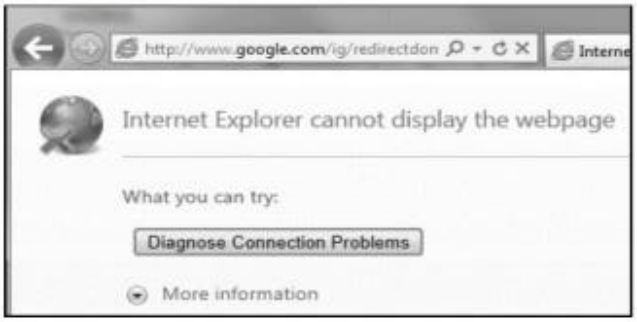
Use the same number as is in the activity. **Duration [20 minutes]**

1. Consider the packages below that advertise Internet access for video streaming at home.

PACKAGE A	PACKAGE B	PACKAGE C
5 GB data Fibre 100 Mbps Free installation + Router R399 p.m.	5 GB data ADSL 2 Mbps Free installation + Router R99 p.m.	Uncapped data Fibre 40 Mbps Free installation + Router R399 p.m.

   a) Which package would one use to daily stream HD videos at home? Give TWO reasons for your answer.
   b) Which package would be sufficient for general home use, such as sending e-mails and browsing the web, for which no video streaming is required? Motivate your answer.

2. The web browser message below is displayed even when an ADSL connection is working.



   Give TWO possible reasons for receiving this message.

3. Name a device that connects a LAN to a WAN.

4. Name ONE type of technology that uses radio waves for data transfer.

5. What is the function of a network switch?

INFORMATION MANAGEMENT is part of CAT paper 2 Assessment and it is not included in this compilation, therefore you should also study it as you prepare for the coming examinations.

Summary of Social Implications

Computer-related crimes

Cybercrime is defined as a crime in which a computer is the object of the crime (hacking, phishing, spamming) or is used as a tool to commit an offense (child pornography, hate crimes). Cybercriminals may use computer technology to access personal information, business trade secrets or use the internet for exploitative or malicious purposes.

Cybercrime encompasses a wide range of activities, but these can generally be broken into two categories:

- Crimes that target computer networks or devices. These types of crimes include viruses and denial-of-service (DoS) attacks.
- Crimes that use computer networks to advance other criminal activities. These types of crimes include cyberstalking, phishing and fraud or identity theft.

Source: https://www.techopedia.com/definition/2387/cybercrime

Scan for article

THEFT OF COMPUTER HARDWARE

Computer hardware is very expensive and it is important that you protect yourself against hardware theft. Here are some general guidelines on how to protect yourself:

- Never leave your laptop or mobile device unattended in a public place.
- Use passwords as a security method.
- Use a cable to lock your equipment to a table or desk in the office.

SOFTWARE THEFT

For additional information

Software theft is the unauthorized copying of software. Most retail programs are licensed for use at just one computer site or for use by only one user at any time. By buying the software, you become a *licensed user* rather than an owner (see EULA). You are allowed to make copies of the program for backup purposes, but it is against the law to give copies to friends and colleagues.

Source: https://www.webopedia.com/TERM/S/software_piracy.html

To avoid software theft, do the following:

- Do not copy, duplicate or distribute any software without a copyright licence.
- Do not download and use illegal software from the internet.
- Do not lend your software so that an illegal copy can be made.

BANDWIDTH THEFT

Bandwidth theft refers to the use of bandwidth without paying for it. Bandwidth theft can also occur when one is connected to an unprotected network.

Precautions include:

- Having good password policies.
- Being careful when installing free software from the internet, as it might be malware.

For additional info checkout this site: https://altlab.com/hotlinking.html

IDENTITY THEFT

Identity theft occurs when someone uses your personal information to pretend to be you to commit fraud or to gain financial benefits.

Your personal information could be your full name, email address, online login and passwords, driver's license number, passport number or bank account number. Criminals can gain access to these types of information and sell it on the dark web to commit identity theft.

Here are some common ways criminals commit identity theft.

Phishing, Skimming, Unsecure web connections, Phone scams, Data breaches, Email spoofing.

THEFT OF TIME AND SERVICES

Theft of time refers to a person receiving payment from his or her employer for work that the employee did NOT do.

Theft of services refers to the person using company equipment, such as a computer or the internet, for personal matters.

CROWDFUNDING

Crowdfunding is a method of raising capital through the collective effort of friends, family, customers, and individual investors. This approach taps into the collective efforts of a large pool of individuals-primarily online via social media and crowdfunding platforms-and leverages their networks for greater reach and exposure.

Source: https://www.fundable.com/learn/resources/guides/crowdfunding/what-is-crowdfunding

Scan for more

These are possible crowd funding options:

- Donation Crowd Funding
- Reward Crowd Funding
- Loan Based Crowd Funding
- Investment Crowd Funding

INTERNET ATTACKS

Scan for more

Internet attacks also known as cyberattacks, is a malicious and deliberate attempt by an individual or organization to breach the information system of another individual or organization. Usually, the attacker seeks some type of benefit from disrupting the victim's network.

Source: https://www.cisco.com/c/en/us/products/security/common-cyberattacks.html

MALWARE

Malware is a term used to describe malicious software, including spyware, ransomware, viruses, and worms. Malware breaches a network through a vulnerability, typically when a user clicks a dangerous link or email attachment that then installs risky software. Once inside the system, malware can do the following:

- Blocks access to key components of the network (ransomware)
- Installs malware or additional harmful software
- Covertly obtains information by transmitting data from the hard drive (spyware)
- Disrupts certain components and renders the system inoperable

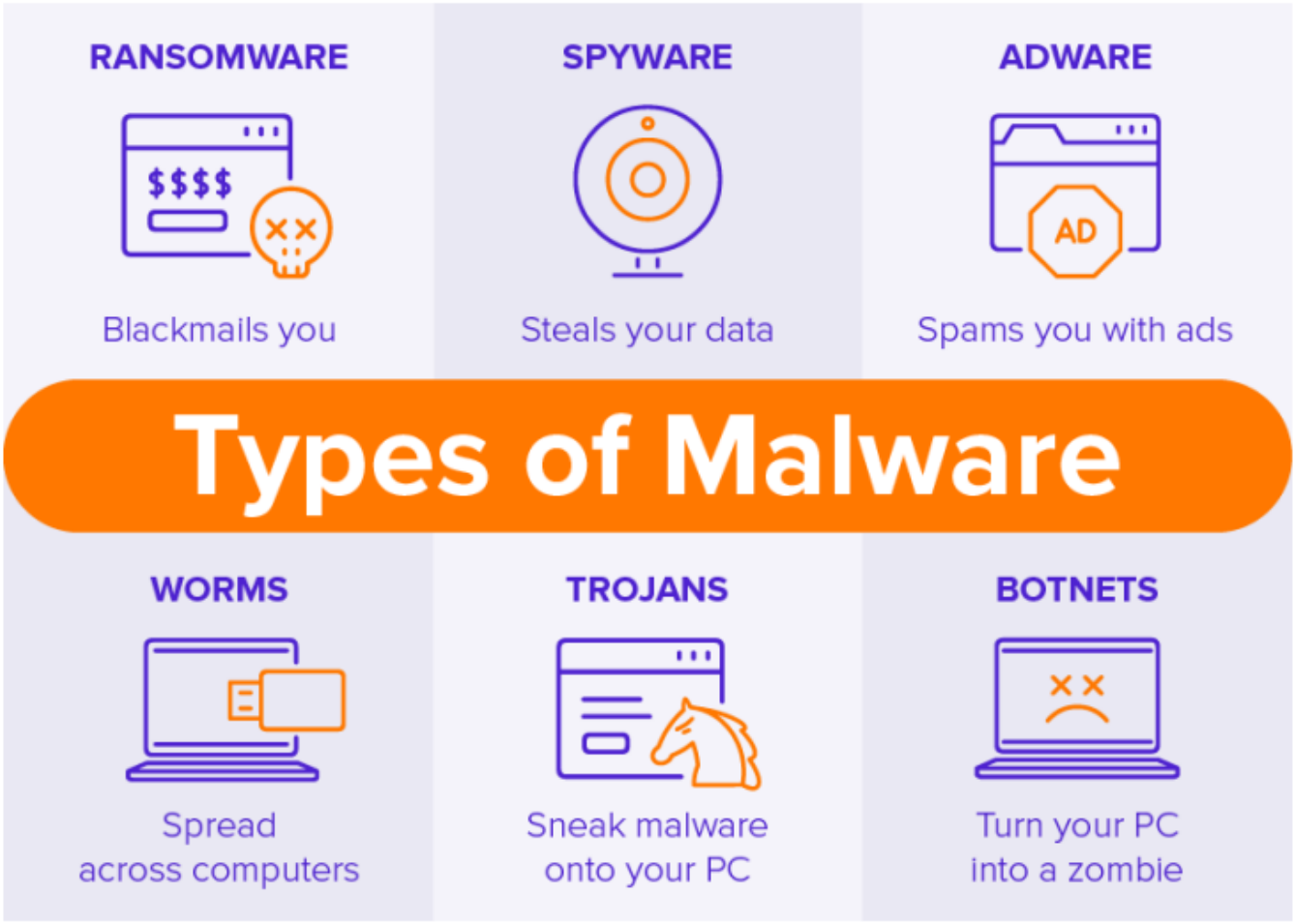


Image source : https://www.avast.com/c-malware

BOTS

Scan to watch clip

An Internet bot, in its most generic sense, is software that performs an automated task over the Internet. More specifically, a bot is an automated application used to perform simple and repetitive tasks that would be time-consuming, mundane or impossible for a human to perform.

Bots can be used for productive tasks, but they are also frequently used for malicious purposes.

Source: https://www.techopedia.com/definition/24063/internet-bot

ZOMBIES

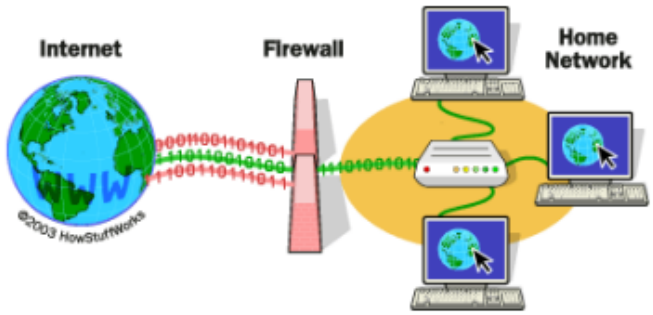
In computing, a zombie is a computer connected to a network that has been compromised and taken over by a hacker, a virus or a Trojan. It can be used remotely for malicious tasks.
Source: https://www.pandasecurity.com/en/security-info/zombie/

RIGHT TO ACCESS VS RIGHT TO PRIVACY

Here are a few examples to look at when it comes to the right of access versus the right to privacy:

If you do your work on a computer owned by someone else, they may have the right to claim access to your data files.
If you use online services such as Facebook you should be aware that their End User License Agreement states that whatever you post belongs to them.
If your school has an AUP for the computer lab that you have accepted, you may have allowed people other than yourself to access your data files.

FIREWALLS



A firewall is a system designed to prevent unauthorised access to or from a private network. You can implement a firewall in either hardware or software form, or a combination of both. Firewalls prevent unauthorised internet users from accessing private networks connected to the internet, especially intranets. All messages entering or leaving the intranet (the local network to which you are connected) must pass through the firewall, which examines each message and blocks those that do not meet the specified security criteria.

Source: https://kb.iu.edu/d/aoru

Image Source: https://computer.howstuffworks.com/firewall.htm

Scan for more

Scan for more

ANTIVIRUS PROGRAMS

Antivirus software is a program or set of programs that are designed to prevent, search for, detect, and remove software viruses, and other malicious software like worms, trojans, adware, and more.
Source: https://www.webroot.com/in/en/resources/tips-articles/what-is-anti-virus-software
Below is a list of antivirus software available:

- **Bitdefender** Antivirus Plus 2019.
- Norton AntiVirus Plus.
- F-Secure Antivirus SAFE.
- Kaspersky Anti-Virus.
- Trend Micro Antivirus+ Security.
- Webroot SecureAnywhere AntiVirus.
- ESET NOD32 Antivirus.
- G-Data Antivirus.

SOCIAL IMPLICATIONS OF E-COMMUNICATIONS AND TECHNOLOGY

IMPACT OF SOCIAL NETWORKING SITES

POSITIVE EFFECTS OF SOCIAL MEDIA	NEGATIVE EFFECTS OF SOCIAL MEDIA
Social media has made it easy to make friends	Encouraging poor grammar and spelling
Social media helps in fostering empathy	Allowing the spread of misinformation that may be perceived as fact even in light of evidence to the contrary Fake news
Social media helps in speedy communication	Exposing children to online predators Providing information that increases the risk of identity theft
Social media makes the world seem small	Creating a culture in which a single mistake such as a racy picture or poorly thought-out comment can cause irreparable harm to someone's reputation
Social media helps in building relationships	Decreasing productivity as workers habitually check social networking sites when they should be working
Social media helps in finding common ground	Creating a platform for cyber bullying

Akram, Waseem. (2018). A Study on Positive and Negative Effects of Social Media on Society. International Journal of Computer Sciences and Engineering. 5. 10.26438/ijcse/v5i10.351354.

Sources: https://www.technology.org/2019/06/06/social-networking-sites-and-the-positive-impact-they-have-on-the-society/

Scan for more

https://www.researchgate.net/publication/323903323_A_Study_on_Positive_and_Negative_Effects_of_Social_Media_on_Society,
https://socialnetworking.lovetoknow.com/Negative_Impact_of_Social_Networking_Sites

The Impact of Technology on the Global Community

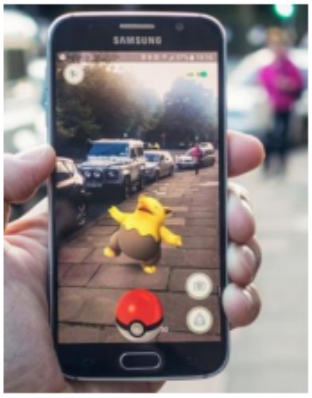
POSITIVE EFFECTS OF TECHNOLOGY	NEGATIVE EFFECTS OF TECHNOLOGY
Telecommuting (e-commuting)	Working environment
Improved healthcare	Environmental problems
Enhances our ability to fight crime	Social effects
Increased productivity	Crime and abuse
Making the impossible, possible	Lack of upskilling
Artificial Intelligence	
Machine learning	
Block chain	

Source: https://www.siyavula.com/read/cat/grade-12-cat/social-implications-of-ecommunications-and-technologies/08-social-implications-of-ecommunications-and-technologies

Scan to read more

VIRTUAL AND AUGMENTED REALITY

Augmented reality (AR) adds digital elements to a live view often by using the camera on a smartphone. Examples of augmented reality experiences include Snapchat lenses and the game Pokemon Go.



Virtual reality (VR) implies a complete immersion experience that shuts out the physical world. Using VR devices such as HTC Vive, Oculus Rift or Google Cardboard, users can be transported into a number of real-world and imagined environments such as the middle of a squawking penguin colony or even the back of a dragon.

Scan for more

Source: https://www.fi.edu/difference-between-ar-vr-and-mr

Social Implications: User-centred design

- Designed to work in the way that a user wants to work.
- Designed to be easy to use and have features in logical places.

Scan me for additional information

Advantages of a UCD approach include:

- Users are less frustrated with the software.
- Users need less training as the layout is logical and user friendly.
- Users make fewer errors.
- Users who have never used the application learn how to use it very quickly.
- Users find websites easy to navigate.
- Data entry can be easy to use.
- Presentations are easier to present or understand.

ACTIVITY 12

Use the same number as is in the activity. **Duration [15 minutes]**

7.1	Give an example of a product that is considered to be intellectual property.	(1)
7.2	Give TWO guidelines that can be found in a school's BYOD policy.	(2)
7.3	Suggest TWO ways in which to prevent computer hardware theft in schools.	(2)
7.4	Explain TWO ways to protect your privacy when using the internet through a public hotspot.	(2)
7.5	Give ONE reason why some companies may NOT allow their employees to telecommute.	(1)
7.6	Discuss TWO negative effects a user can experience if he/she overuses social media.	(2)
		[10]

ACTIVITY 13

Use the same number as is in the activity. **Duration [15 minutes]**

7.1 Give the term for a type of malware designed to encrypt or block access to your computer system and files until you pay a sum of money. (1)

7.2 Why do recruitment agencies check the social media accounts of jobseekers? (1)

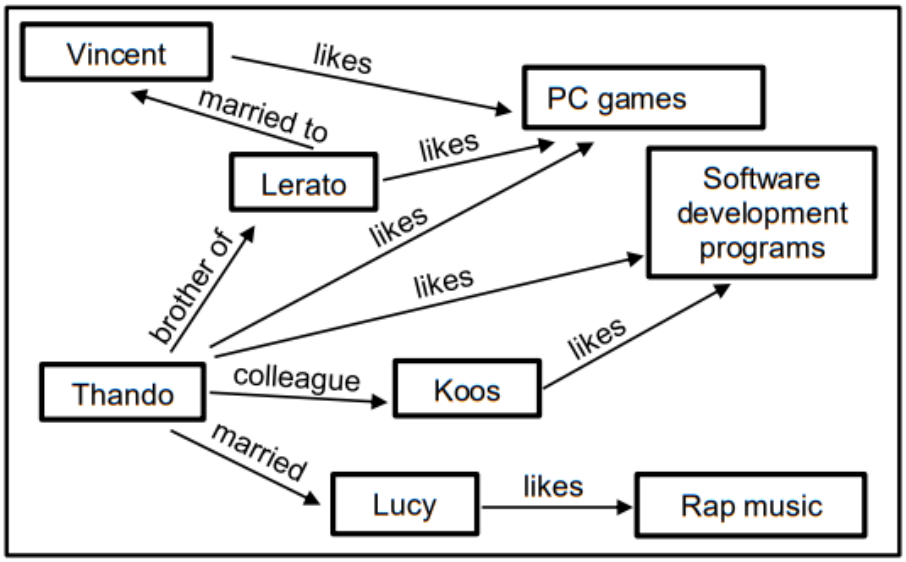
7.3 Some free apps are not really free.

Give ONE reason to support the statement above. (1)

7.4 Explain how user-centred design (UCD) can be applied when creating an electronic form that will be used by partially sighted people. (2)

7.5 Give TWO measures to prevent cyber criminals from accessing a computer system. (2)

7.6 Study the diagram below that represents a group on social media.



7.6.1 What is the purpose of this diagram? (1)

7.6.2 Suggest a product that could be advertised for this particular social group. Motivate your answer. (2)
[10]

The CAPS (p. 18) suggests the inclusion of newer technologies and a phasing out of old technologies as there is a rapid development in the subject which should be reflected in what the learners are taught and what is examined. This Examination Guidelines document lists the new technologies that can be expected in the examination paper and outlines the depth of knowledge required for an end-user.
The depth of knowledge required for all the existing concepts and terminology below includes, inter alia:

- Definition – what it is
- Purpose/Function – what it does, why it is needed
- Advantages/Disadvantages
- Benefits/Limitations
- Application in an ICT environment

4.3.1 Clarification of some existing concepts and newer technologies for Paper 2

Most of the technologies and concepts below are listed in the CAPS. The depth of knowledge required is as listed in 4.2 above, but some aspects in respect of these technologies/concepts are clarified below.

Storage devices and media:

- **Solid-state drive:** A drive that has no moving parts, making it quieter and more robust. They operate much faster than traditional hard drives as they store data electronically and not magnetically as with a traditional hard drive. (CAPS p. 22)
- **Card reader:** A device connected to a computer that is designed to accept and read data from different types of storage media, such as SIM and SD cards and flash drives. (CAPS p. 22)

Input and output devices:

- **Multi-touch screen:** Feature of a screen that allows it to register more than one point being touched simultaneously. (CAPS p. 22)
- **HDMI:** High-definition multimedia interface is a standard/port for connecting high-definition video devices, such as computer monitors, video projectors and digital television. HDMI carries high quality video and audio signals, and there is no need for separate audio cables as with VGA. (CAPS p. 30)
- **3D printing/printers:** 3D printers can create three-dimensional solid objects (e.g. motor vehicle parts, human tissue replacement, jewellery, clothing, small buildings, small boats) from a digital model of the item by adding successive layers of material on top of one another. (CAPS p. 20)

Communication and communication devices:

- **Standards for wireless communication** which provides for high-speed data transfer between cellular devices (such as smartphones and tablets) and ISPs. Each generation, e.g. 5G or 6G, increases the capacity and speed of previous mobile connections. (CAPS p. 35)
- **NFC:** Near field communication (NFC) is a standard that allows devices such as smartphones to connect wirelessly simply by touching them together or bringing them into close proximity to, for example, exchange files by just touching two smartphones together or for sending a file from a smartphone to a printer wirelessly. (CAPS p. 35)
- **Video communications** – also include platforms such as Zoom, Microsoft Teams and Google Meet.

Internet technologies:

- **URL shortener:** This is a tool or service, such as TinyURL.com, which converts a long URL to a shorter version. This shorter version of the URL will take a user to the same web address, but is easier to remember and/or type out. (CAPS p. 25)
- **Internet of Things (IoT):** This refers to the trend whereby all sorts of objects and devices are increasingly being connected to one another via the internet. This can range from surveillance systems to geysers, washing machines, 'smart' vehicles and traffic lights, etc. Various sensors in the devices can produce data for all sorts of purposes, including diagnostics and running systems more efficiently. (EG 2017)
- **Autonomous vehicles:** A self-driving car, also known as an autonomous vehicle, driverless car, or robo-car is a vehicle that can sense its environment and move safely with little or no human input.

- **Drone technology:** A drone, is an unmanned aircraft. Essentially, a drone is a flying robot that can be remotely controlled or fly autonomously through software-controlled flight plans in their embedded systems, working in conjunction with on-board sensors and GPS. They are widely used in agriculture, photography, game ranging, parcel deliveries, etc.
- **Wearable devices and technologies:** Wearable technologies such as electronic mobile devices worn as accessories or part of clothing, e.g. smartwatches or fitness/health trackers, smart glasses, continuously generating data from various environments and communicating with other devices/PC/networks.
- **Shaping (Network tuning):** A technique whereby certain network (internet) services, e.g. e-mail, are given preference while others, such as social networking services, are given less priority, thus performance is maintained for the more critical services. (EG 2017)
- **Throttling (Policing):** This occurs when your ISP slows down your internet connection. This most often occurs when you have been deemed by your ISP to have downloaded excessive amounts of data. Each ISP has an acceptable use policy (AUP) which specifies how this is determined and implemented. (EG 2017)

Properties/Metadata:

- **Geo-tagging:** A process where a geographical position of where a photograph was taken is added to the metadata of a file, such as adding the latitude and longitude. (CAPS p. 40)

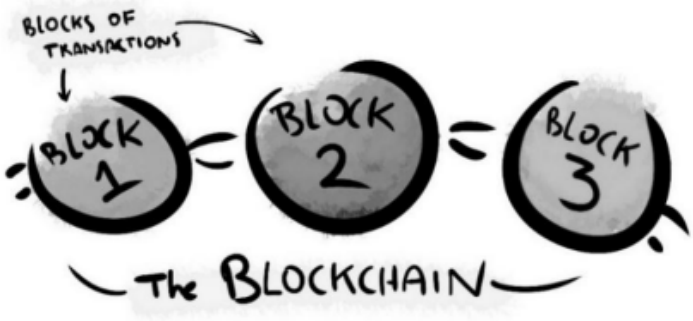
Cyber security issues:

- **Click-jacking:** Users are tricked into clicking on an item on a web page which acts as a concealed link. (CAPS p. 42)
- **Ransomware:** A type of malware designed to encrypt or block access to your computer system and files until you pay a sum of money ('ransom'). (EG 2017)
- **Screen lock pattern:** A way of locking a device by setting up a pattern you must draw or trace on the screen to unlock the device. (EG 2017)
- **Authentication (Internet safety):** Two-factor (two-step) authentication: includes the use of CAPTCHA, OTP (one-time pin/password), ApproveIt messages, etc.

How technology can benefit society/social implications

- **Crowd funding:** A process where a single idea or business practice is funded by multiple small donations from volunteer contributors, usually before the business venture is started. The contributors will then receive the product when it is finally put into production. Examples: www.indiegogo.com and www.kickstarter.com. (CAPS p. 45)
- **BYOD:** Bring your own device (BYOD) refers to a concept where employees/students are allowed to bring and use their own portable devices, such as smartphones, laptops, tablets, to work on and access the network instead of a device owned/supplied by the company/ institution. (CAPS p. 32)
- **Big data:** Very large structured and unstructured data sets that are analysed using computers to reveal trends and associations. These present challenges, such as storage, curation, querying, visualisation. (EG 2017)
- **Cryptocurrencies** (e.g. Bitcoin, Ethereum, Luno): This is a form of virtual, digital currency. Bitcoins can be exchanged for other currencies, products and services. They have caused concern because they are often used for payment in criminal activities, such as ransomware demands. However, more and more legitimate companies are accepting them as a means of payment. (EG 2017)

- **E-learning:** The creation of a learning environment where individuals use their computers to take part in teaching and learning to further their education
- **Mobile or M-Learning:** A form of education and training delivered and conducted via the internet using mobile devices, such as tablets and smartphones. It is designed to be flexible, allowing learners/workers/students access to education anywhere, anytime. (EG 2017)
- **Virtual reality (VR):** This refers to using technology to create a simulation of a 3D environment that can be interacted with by a person in a seemingly real or physical way. This is achieved by using equipment, such as helmets with screens and gloves fitted with sensors. (EG 2017)
- **Augmented reality (AR)** uses types of technology similar to VR but does not create a totally virtual environment like VR. Instead, it takes the physical world and adds (augments) objects, such as graphics, within the real world. Both VR and AR are used in areas ranging from entertainment (e.g. the augmented reality game Pokémon GO), training in aircraft simulators, and healthcare (e.g. an app used to highlight veins when a drip is inserted or surgeons being able to perform remote surgery on patients.
- **AI (artificial intelligence):** Refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions, especially traits associated with a human mind, such as learning and problem-solving. Machine learning is the study of computer algorithms that improve automatically through experience and by the use of data. It is seen as a part of artificial intelligence.
- **4IR (the fourth industrial revolution):** 4IR is a way of describing the blurring of boundaries between the physical, digital and biological worlds. It is a blend of advances in artificial intelligence (AI), robotics, the Internet of Things (IoT), 3D printing, genetic engineering, quantum computing and other technologies. It creates many products and services that are fast becoming essential to modern life and is the collective force behind disrupting almost every business sector.
- **5IR (the fifth industrial revolution):** 5IR runs and develops alongside 4IR and uses the advantages 4IR brings to put the focus back on humans and human endeavour, defining the ethics and impact of technology developed in the 4IR.
- **Blockchain:** The name of a whole new technology. It is a sequence of blocks or groups of transactions that are chained together and distributed among the users.
  'The blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions, but virtually everything of value.' – Don & Alex Tapscott
  It works as **an indisputable record of transactions that do not require reliance on an external authority** to validate the authenticity and integrity of the data. Transactions are typically economic, but **we can store any kind of information** in the blocks.



[Adapted from https://medium.com/swlh/blockchain-for-dummies-d3daf2170068]

4.3.2 Technology/Concepts that will no longer be examined

As technology improves, many technologies may become obsolete or will no longer be relevant and will therefore not be examined.

Concepts/Technologies that will no longer be assessed from 2021 onwards:

- CRT monitors
- Digital migration
- Encarta
- Fax/Fax modems
- FireWire
- Freeware/Shareware software
- FTP
- MICR
- MySpace
- OMR
- PDA
- RSS Feeds (social media platforms and e-mail subscriptions seem to be making this a technology less used these days.)
- Second Life
- Stand-alone vs. integrated software in terms of Office Suites
- Trackball mouse
- Widgets

4.3.3 Clarification of blurred technology/concepts

In other cases, the set differences between devices/technologies may have become blurred. As a result, some aspects of these concepts/devices will not be examined in order to avoid confusion for the candidates, as well as during the marking process.

- Devices such as **printers** WILL BE examinable, but the comparisons between various printer types will NOT be examinable.
- **802.11 a/b/g/n:** Candidates should know that 802.11 refers to a Wi-Fi connectivity standard. The details on the specific standards, i.e. a/b/g/n, will NOT be examinable. (CAPS p. 35)
- The concept of a **plug-in** as a way of customising the browser or program has been largely replaced by **add-on**, which is an extension of the software. Candidates will NOT be required to distinguish between these two concepts. The term **add-on** will be preferred.
- Candidates will no longer be required to distinguish between a **phablet** and a **tablet**. A **phablet** is a small screen tablet or a larger screen smartphone.
- **Modem and router:** Distinguish between the function of a modem and the function of a router, even if it is one converged device.
- **Differentiation between LCD and LED monitors will NOT be examined.**

ACTIVITY

Here are some multiple-choice questions based on the provided information:

1. What makes a Solid-state drive (SSD) faster than a traditional hard drive?

a) It has more storage capacity.

b) It uses magnetic storage.

c) It has no moving parts.

d) It is larger in size.

2. Which input/output device allows a screen to register more than one point being touched simultaneously?

a) Multi-port adapter

b) Multi-touch screen

c) Multi-function keyboard

d) Multi-color printer

3. What is the purpose of a URL shortener?

a) To convert long URLs to shorter versions

b) To convert short URLs to longer versions

c) To redirect users to different websites

d) To track users' browsing activities

4. What is the standard that allows devices like smartphones to connect wirelessly by touching them together?

a) Bluetooth

b) NFC (Near Field Communication)

c) Wi-Fi

d) USB

5. What is the primary purpose of a drone?

a) Playing games

b) Capturing photographs

c) Assisting in navigation

d) Monitoring weather conditions

6. What does BYOD stand for in the context of technology in the workplace/education?

a) Bring Your Own Devices

b) Buy Your Own Devices

c) Build Your Own Devices

d) Borrow Your Own Devices

7. Which technology refers to the simulation of human intelligence in machines?

a) 3D printing

b) Internet of Things (IoT)

c) Augmented reality (AR)

d) Artificial Intelligence (AI)

8. What does the term "Blockchain" refer to?

a) A group of interconnected devices in a network

b) A sequence of blocks with complex data structures

c) A software tool used for data storage

d) A type of virus that affects computer systems

9. What is the purpose of "geo-tagging" in metadata?

a) Encrypting files for added security

b) Adding geographical information to files

c) Organizing files in a specific location

d) Compressing files to reduce size

10. Which technology allows for the connection of various objects and devices via the internet?

a) Virtual Reality (VR)

b) Artificial Intelligence (AI)

c) Internet of Things (IoT)

d) 3D Printing

ACTIVITY

Here are 20 multiple-choice questions and answers based on the provided information:

1. What is a solid-state drive (SSD)?

    a. A drive that uses magnetic storage technology.

    b. A drive that has no moving parts and stores data electronically.

    c. A drive that is designed to read data from SIM cards and flash drives.

    d. A drive that operates at slower speeds compared to traditional hard drives.

    Answer: b

2. What is the purpose of a card reader?

    a. To connect high-definition video devices.

    b. To add successive layers of material in 3D printing.

    c. To accept and read data from different types of storage media.

    d. To register multiple points being touched on a screen simultaneously.

    Answer: c

3. What is HDMI?

    a. A technique for network tuning and prioritizing services.

    b. A tool for converting long URLs to shorter versions.

    c. A standard for connecting high-definition video devices.

    d. A process of adding geographical positions to image metadata.

    Answer: c

4. What can 3D printers create?

    a. Solid-state drives and card readers.

    b. Autonomous vehicles and drones.

    c. Electronic mobile devices and smart glasses.

    d. Three-dimensional solid objects from digital models.

Answer: d

5. What is NFC?

a. A standard for wireless communication between cellular devices.

b. A technique for shaping and prioritizing network services.

c. A tool for converting long URLs to shorter versions.

d. A standard that allows devices to connect wirelessly by touching them together.

Answer: d

6. Which of the following is an example of video communication platform?

a. Geo-tagging

b. NFC

c. Zoom

d. URL shortener

Answer: c

7. What does IoT stand for?

a. Internet of Things

b. Input and Output Technologies

c. Infrared and Optical Transmission

d. Intelligent Operating Systems

Answer: a

8. What is the purpose of a URL shortener?

a. To connect high-definition video devices.

b. To prioritize network services.

c. To convert long URLs to shorter versions.

d. To add geographical positions to image metadata.

Answer: c

9. What are autonomous vehicles?

a. Unmanned aircraft used for various purposes.

b. Wearable devices and technologies.

c. Self-driving cars that can sense and navigate their environment.

d. Network tuning techniques for prioritizing critical services.

Answer: c

10. What are wearable devices?

a. Solid-state drives and card readers.

b. Electronic mobile devices worn as accessories or clothing.

c. Tools for converting long URLs to shorter versions.

d. Sensors used in autonomous vehicles and drones.

Answer: b

11. What is shaping in network tuning?

a. Giving preference to critical services over less critical services.

b. Slowing down the internet connection due to excessive data usage.

c. Adding geographical positions to image metadata.

d. Connecting high-definition video devices using HDMI.

Answer: a

12. What is click-jacking?

a. A process of encrypting computer systems and demanding ransom.

b. Connecting smartphones wirelessly using NFC.

c. Tricking users into clicking on concealed links on web pages.

d. A way of locking devices with a pattern drawn on the screen.

Answer: c

13. What is e-learning?

a. A process of funding ideas or business practices through small donations.

b. Using smartphones, laptops, and tablets for work or accessing networks.

c. Analyzing large data sets to reveal trends and associations.

d. Taking part in teaching and learning through computers.

Answer: d

14. What is mobile learning (M-Learning)?

a. A process of funding ideas or business practices through small donations.

b. Using smartphones, laptops, and tablets for work or accessing networks.

c. Analyzing large data sets to reveal trends and associations.

d. Taking part in education and training via mobile devices and the internet.

Answer: d

15. What is virtual reality (VR)?

a. Creating a simulation of a 3D environment for interaction.

b. Using technology to add graphics to the physical world.

c. Simulating human intelligence in machines.

d. Analyzing large data sets using computers.

Answer: a

16. What is augmented reality (AR)?

a. Creating a simulation of a 3D environment for interaction.

b. Using technology to add graphics to the physical world.

c. Simulating human intelligence in machines.

d. Analyzing large data sets using computers.

Answer: b

17. What is AI (artificial intelligence)?

a. Creating a simulation of a 3D environment for interaction.

b. Using technology to add graphics to the physical world.

c. Simulating human intelligence in machines.

d. Analyzing large data sets using computers.

Answer: c

18. What is the fourth industrial revolution (4IR)?

a. The trend of connecting objects and devices via the internet.

b. A blend of advances in AI, robotics, IoT, 3D printing, etc.

c. The study of computer algorithms that improve through experience.

d. The blurring of boundaries between physical, digital, and biological worlds.

Answer: b

19. What is the fifth industrial revolution (5IR)?

a. The trend of connecting objects and devices via the internet.

b. A blend of advances in AI, robotics, IoT, 3D printing, etc.

c. The study of computer algorithms that improve through experience.

d. A focus on human ethics and impact of technology developed in 4IR.

Answer: d

20. What is blockchain?

a. A technique for network tuning and prioritizing services.

b. A tool for converting long URLs to shorter versions.

c. A virtual, digital currency used for payments.

d. A sequence of blocks that store transactions in an incorruptible digital ledger.

Answer: d

*********THE END*********